IANA Registries for BGP Extended Communities

draft-ietf-idr-extcomm-iana-02.txt

Abstract

   This document reorganizes the IANA Registries for the type values and
   sub-type values of BGP Extended Communities attribute and the BGP
   IPv6-Address-Specific Extended Communities attribute. This is done
   in order to remove inter-dependencies among the registries, thus
   making it easier for IANA to determine which codepoints are available
   for assignment in which registries. This document also clarifies the
   information that must be provided to IANA when requesting an
   allocation from one or more of these registries. These changes are
   compatible with the existing allocations, and thus do not affect
   protocol implementations. The changes will however impact the "IANA
   Considerations" sections of future protocol specifications. This
   document updates RFC 4360 and RFC 5701.

Status of this Memo

The list of Internet-Draft Shadow Directories can be accessed at
http://www.ietf.org/shadow.html.

Table of Contents

1. **Introduction**

   RFC 4360 [RFC4360] defines the BGP "Extended Communities" (EC)
   attribute. This attribute consists of a sequence of eight-octet
   "extended communities". The high-order octet is defined to be the
   "Type" field. Each Type has a range of values for "Transitive
   Extended Community Types" and a range of values for "Non-transitive
   Extended Community Types". Some of these ranges are further sub-
   divided into a sub-range of values to be assigned by IANA under the
   "Standards Action (with Early Allocation)" policy a sub-range of
   values to be assigned by IANA under the "First Come First Served"
   policy, and a sub-range for "experimental use". (See [RFC5226],
   [RFC4020], and [RFC3692] for an explanation of these policies.)

   For some Extended Community Types, the second octet of the Extended
   Community is a "Sub-Type" field, and the remaining six octets are the
   "Value" field. These are referred to as "Extended Types". For other
   types, there is no Sub-Type field, and the Value field contains seven
   octets. These are referred to as "Regular Types".

   RFC 4360 is not very specific about how the IANA registries for
   Extended Community Types and/or Sub-Types are to be organized, and
   this has led to some confusion. The purpose of this document is to
   reorganize the registries to make the IANA codepoint allocation task
   more straightforward.

2. **Types, Sub-Types, and Registries**

   The high-order octet of an Extended Community will be known as the
   "Type Field".

   There will be one IANA registry for "Transitive Extended Community
   Types" (see section 5.1.1), and one for "Non-transitive Extended
   Community Types" (section 5.1.2). Each registry specifies three
   ranges, and each range is associated with a particular IANA
   allocation policy.

   There will be a set of IANA registries for Extended Community Sub-
   Types (see section 5.2). Each such registry will have a range of
   0x00-0xFF. Values in the range 0x00-0xBF are assignable by IANA
   according to the "First Come, First Served" allocation policy of
   [RFC5226]. Values in the range 0xC0-0xFF are assignable by IANA
   according to the "IETF Review" allocation policy of [RFC5226].

   If a particular Type has Sub-Types, that Type's entry in its Type
   registry identifies its Sub-Type registry. Note that some Types do
   not have Sub-Types. When the request is made to establish a new Type

registry, the request must specify whether or not there is to be a
Sub-Type registry associated with that Type.

Whether a given Type has Sub-Types is determined when the Type is
initially defined; this cannot be changed later.

3. **Applicability to IPv6 Address Specific EC Attribute**

RFC 5701 [RFC5701] defines the IPv6 Address Specific Extended
Community to be a 20-octet quantity whose high order two octets may
be considered to be the "Type Field". The high order octet is either
0x00, indicating a transitive Extended Community, or 0x40, indicating
a Non-transitive Extended Community. The second octet is said to be
a "Sub-Type" and it is suggested that the Sub-Types are the same as
the Sub-Types for the IPv4-Address-Specific Extended Community.
However, the existing IANA codepoint allocations for this octet do
not always match the corresponding allocations for the IPv4-Address-
Specific Extended Community Sub-Types.

This document modifies RFC 5701 by removing any requirement for the
values of the second octet of the IPv6-Address-Specific Extended
Community Type codepoints to match the codepoints in the
IPv4-Address-Specific Sub-Types registry.

This document requests IANA to create two IPv6-Address-Specific
Extended Community registries, one for transitive communities and one
for non-transitive communities. See section 5.3.

4. **How to Request EC Type and/or Sub-Type Codepoints**

When a codepoint is needed for a new Extended Community, the
requester should first determine whether an existing Type can be
used. If so, IANA should be asked to allocate a codepoint from the
corresponding Sub-Type registry, if there is one.

If a new Extended Community Type is needed, the requester should ask
IANA to allocate a new type from either the "Transitive Extended
Community Types" registry, the "Non-transitive Extended Community
Types" registry, or both. It is up to the requester to state whether
an allocation is needed from one or both of these registries. When
an allocation from both registries is requested, the requester may
find it desirable for both allocations to share the same low-order
six bits. If so, it is the responsibility of the requester to
explicitly request this of IANA.

Of course, any request for a codepoint from a particular registry
must follow the defined registration procedures for that registry.

If a new Extended Community Type is needed, and the new Type is to
have Sub-Types, the requester should specify whether an existing Sub-
Type registry can be used for the new Type, or whether a new Sub-Type
registry is needed. (At the current time, every Type that has Sub-
Types is associated with a unique Sub-Type registry. It is possible
that in the future a new Type registry may be created that is
associated with a pre-existing Sub-Type registry.) In either case,
if a new Sub-Type value needs to be allocated from a particular Sub-
Type registry, the request should explicitly identify the registry.

If the creation of a new Sub-Type registry is requested, the range of
values is always 0x00-0xFF. It is recommended that the allocation
policy described in section 2 be used. I.e., 0x00-0xBF to be
allocated by IANA under the "First Come, First Served" policy, and
0xC0-0xFF to be allocated by IANA under the "IETF Review" policy.

Commonly, a new Extended Community is defined such that it can be of
several Types. E.g., one may want to define a new Extended Community
so that it can be either transitive or non-transitive, so that it can
be either of the Two-octet AS Number Type or the Four-octet AS Number
Type, etc. The requester is responsible for explicitly asking IANA
to allocate codepoints in all the necessary Type and/or Sub-Type
registries.

When a new Extended Community is defined, it may be necessary to ask
IANA to allocate codepoints in several Sub-Type registries. In this
case, it is a common practice to ask IANA to allocate the same
codepoint value in each registry. If this is desired, it is the
responsibility of the requester to explicitly ask IANA to allocate
the same value in each registry.

When a new Extended Community Sub-Type codepoint is allocated, it may
also be desirable to allocate a corresponding value in one or both of
the IPv6-Address-Specific Extended Community registries. The
requester is responsible for requesting this allocation explicitly.
If the requester would like the same numerical value to be allocated
in an IPv6-Address-Specific Extended Community registry that is
allocated in some other registry, it is the responsibility of the
requester to explicitly ask this of IANA.

5. **IANA Considerations**

   IANA is to replace the pre-existing BGP Extended Communities
   registries with the registries described in this section.

   Any Extended Community Type or Sub-type codepoints allocated by IANA
   between the date of this document and the date at which the
   registries are reorganized must also be incorporated into the new
   registry organization. The authors will work with IANA to ensure
   that this is done correctly.

   The registries reproduced below do not include the "references" or
   "date" fields for the individual codepoints in the registries,
   because it is difficult to incorporate those within the 72-character
   line limitation of RFCs. The references and associated dates must be
   copied from the current registries when the new registries are
   introduced; the authors will work with IANA to ensure that this
   information is carried over correctly to the new registry
   organization. As this document does not change the usage or
   semantics of any of the codepoints, the references associated with
   the individual codepoints do not change.

   On the other hand, the reference for each of the registries defined
   in this section should be changed to this document.

5.1. **Registries for the TYPE Field**

5.1.1. **Transitive Types**

   This registry shall contain the following note:

      This registry contains values of the high-order octet (the "Type
      Field") of a Transitive Extended Community.

Registry Name: BGP TRANSITIVE EXTENDED COMMUNITY TYPES

RANGE	REGISTRATION PROCEDURES
0x00-0x3F	First Come, First Served
0x80-0x8F	Experimental Use (see [RFC 3692](RFC 3692))
0x90-0xBF	Standards Action (early allocation per [RFC 4020](RFC 4020))

TYPE VALUE	NAME
0x00	Transitive Two-Octet AS-specific Extended Community (Sub-Types are defined in the "Transitive Two-Octet AS-specific Extended Community Sub-Types" Registry)
0x01	Transitive IPv4-Address-specific Extended Community (Sub-Types are defined in the "Transitive IPv4-Address-specific Extended Community Sub-Types" Registry)
0x02	Transitive Four-Octet AS-specific Extended Community (Sub-Types are defined in the "Transitive Four-Octet AS-specific Extended Community Sub-Types" Registry)
0x03	Transitive Opaque Extended Community (Sub-Types are defined in the "Transitive Opaque Extended Community Sub-Types" Registry)
0x04	QoS Marking
0x05	CoS Capability
0x06	EVPN (Sub-Types are defined in the "EVPN Extended Community Sub-types" Registry)
0x08	Flow spec redirect/mirror to IP next-hop
0x80	Generic Transitive Experimental Extended Community (Sub-Types are defined in the "Generic Transitive Experimental Extended Community Sub-Types" Registry)

5.1.2. Non-Transitive Types

   This registry shall contain the following note:

      This registry contains values of the high-order octet (the "Type
      Field") of a Non-transitive Extended Community.

Registry Name: BGP NON-TRANSITIVE EXTENDED COMMUNITY TYPES

   RANGE   REGISTRATION PROCEDURES

   0x40-0x7F   First Come, First Served
   0xC0-0xCF   Experimental Use (see RFC 3692)
   0xD0-0xFF   Standards Action (early allocation per RFC 4020)

   TYPE VALUE   NAME

   0x40   Non-Transitive Two-Octet AS-specific Extended
                        Community (Sub-Types are defined in the
                        "Non-Transitive Two-Octet AS-specific Extended
                        Community Sub-Types" Registry)

   0x41   Non-Transitive IPv4-Address-specific Extended
                        Community (Sub-Types are defined in the
                        "Non-transitive IPv4-Address-specific Extended
                        Community Sub-Types" Registry)

   0x42   Non-Transitive Four-Octet AS-specific Extended
                        (Sub-Types are defined in the "Non-Transitive
                        Four-Octet AS-specific Extended Community
                        Sub-Types" Registry)

   0x43   Non-Transitive Opaque Extended Community
                        (Sub-Types are defined in the "Non-Transitive
                        Opaque Extended Community Sub-Types" Registry)

   0x44   QoS Marking

5.2. Registries for the Sub-Type Field

5.2.1. EVPN Sub-Types

This registry shall contain the following note:

>   This registry contains values of the second octet (the "Sub-Type
>   field") of an extended community, when the value of the first
>   octet (the "Type field") is 0x06.

Registry Name: EVPN EXTENDED COMMUNITY SUB-TYPES

    RANGE   REGISTRATION PROCEDURE

    0x00-0xBF   First Come, First Served
    0xC0-0xFF   IETF Review

    SUB-TYPE VALUE   NAME

    0x00   MAC Mobility
    0x01   ESI MPLS Label
    0x02   ES Import

5.2.2. Transitive Two-Octet AS-Specific Sub-Types

This registry shall contain the following note:

>   This registry contains values of the second octet (the "Sub-Type
>   field") of an extended community, when the value of the first
>   octet (the "Type field") is 0x00.

Registry Name: TRANSITIVE TWO-OCTET AS-SPECIFIC
              EXTENDED COMMUNITY SUB-TYPES

```
   RANGE              REGISTRATION PROCEDURE

   0x00-0xBF          First Come, First Served
   0xC0-0xFF          IETF Review


   SUB-TYPE VALUE     NAME

   0x02               Route Target
   0x03               Route Origin
   0x05               OSPF Domain Identifier
   0x08               BGP Data Collection
   0x09               Source AS
   0x0A               L2VPN Identifier
   0x10               Cisco VPN-Distinguisher
```


5.2.3. Non-Transitive Two-Octet AS-Specific Sub-Types

   This registry shall contain the following note:

      This registry contains values of the second octet (the "Sub-Type
      field") of an extended community, when the value of the first
      octet (the "Type field") is 0x40.

Registry Name: NON-TRANSITIVE TWO-OCTET AS-SPECIFIC
              EXTENDED COMMUNITY SUB-TYPES

```
   RANGE              REGISTRATION PROCEDURE

   0x00-0xBF          First Come, First Served
   0xC0-0xFF          IETF Review


   SUB-TYPE VALUE     NAME

   0x04               Link Bandwidth Extended Community
```

5.2.4. Transitive Four-Octet AS-Specific Sub-Types

   This registry shall contain the following note:

      This registry contains values of the second octet (the "Sub-Type
      field") of an extended community, when the value of the first
      octet (the "Type field") is 0x02.

Registry Name: TRANSITIVE FOUR-OCTET AS-SPECIFIC EXTENDED
               COMMUNITY SUB-TYPES

     RANGE   REGISTRATION PROCEDURE

     0x00-0xBF   First Come, First Served
     0xC0-0xFF   IETF Review

     SUB-TYPE VALUE   NAME

     0x02   Route Target
     0x03   Route Origin
     0x04   Generic
     0x05   OSPF Domain Identifier
     0x08   BGP Data Collection
     0x09   Source AS
     0x10   Cisco VPN Identifier

5.2.5. Non-Transitive Four-Octet AS-Specific Sub-Types

   This registry shall contain the following note:

      This registry contains values of the second octet (the "Sub-Type
      field") of an extended community, when the value of the first
      octet (the "Type field") is 0x42.

Registry Name: NON-TRANSITIVE FOUR-OCTET AS-SPECIFIC
               EXTENDED COMMUNITY SUB-TYPES

```
   RANGE               REGISTRATION PROCEDURE

   0x00-0xBF           First Come, First Served
   0xC0-0xFF           IETF Review


   SUB-TYPE VALUE     NAME

   0x04               Generic
```


5.2.6. Transitive IPv4-Address-Specific Sub-Types

   This registry shall contain the following note:

      This registry contains values of the second octet (the "Sub-Type
      field") of an extended community, when the value of the first
      octet (the "Type field") is 0x01.

Registry Name: TRANSITIVE IPV4-ADDRESS-SPECIFIC
               EXTENDED COMMUNITY SUB-TYPES

```
   RANGE               REGISTRATION PROCEDURE

   0x00-0xBF           First Come, First Served
   0xC0-0xFF           IETF Review


   SUB-TYPE VALUE     NAME

   0x02               Route Target
   0x03               Route Origin
   0x05               OSPF Domain Identifier
   0x07               OSPF Route ID
   0x0A               L2VPN Identifier
   0x0B               VRF Route Import
   0x10               Cisco VPN-Distinguisher
```

[5.2.7](5.2.7). Non-Transitive IPv4-Address-Specific Sub-Types

This registry shall contain the following note:

> This registry contains values of the second octet (the "Sub-Type
> field") of an extended community, when the value of the first
> octet (the "Type field") is 0x41.

Registry Name: NON-TRANSITIVE IPV4-ADDRESS-SPECIFIC
               EXTENDED COMMUNITY SUB-TYPES

     RANGE   REGISTRATION PROCEDURE

    0x00-0xBF   First Come, First Served
    0xC0-0xFF   IETF Review

    None Assigned

[5.2.8](5.2.8). Transitive Opaque Extended Community Sub-Types

This registry shall contain the following note:

> This registry contains values of the second octet (the "Sub-Type
> field") of an extended community, when the value of the first
> octet (the "Type field") is 0x03.

Registry Name: TRANSITIVE OPAQUE
               EXTENDED COMMUNITY SUB-TYPES

     RANGE   REGISTRATION PROCEDURE

    0x00-0xBF   First Come, First Served
    0xC0-0xFF   IETF Review

    SUB-TYPE VALUE   NAME

    0x06   OSPF Route Type
    0x0B   Color Extended Community
    0x0C   Encapsulation Extended Community
    0x0D   Default Gateway

[5.2.9](5.2.9). Non-Transitive Opaque Extended Community Sub-Types

   This registry shall contain the following note:

      This registry contains values of the second octet (the "Sub-Type
      field") of an extended community, when the value of the first
      octet (the "Type field") is 0x43.

Registry Name: NON-TRANSITIVE OPAQUE
               EXTENDED COMMUNITY SUB-TYPES

     RANGE   REGISTRATION PROCEDURE

     0x00-0xBF   First Come, First Served
     0xC0-0xFF   IETF Review

     SUB-TYPE VALUE   NAME

     0x00   BGP Origin Validation State

[5.2.10](5.2.10). Generic Transitive Experimental Use Sub-Types

Registry Name: BGP GENERIC TRANSITIVE EXPERIMENTAL USE
               EXTENDED COMMUNITY SUB-TYPES

     RANGE   REGISTRATION PROCEDURE

     0x00-0xBF   First Come, First Served
     0xC0-0xFF   IETF Review

     SUB-TYPE VALUE   NAME

     0x06   Flow spec traffic-rate
     0x07   Flow spec traffic-action (Use of the Value Field
                          is defined in the "Traffic Action Field"
                          registry)
     0x08   Flow spec redirect
     0x09   Flow spec traffic-remarking
     0x0A   Layer2 Info Extended Community

Note: [RFC 5575](RFC 5575) contains narrative text that declares the "Flow spec
traffic-rate" to be non-transitive, but then assigns it a codepoint that

indicates it to be transitive. Addressing this error in RFC 5575 is not
within the scope of the current document.

5.2.11. Registries for the Value Field

   At the time of writing of this document, there is only one registry
   containing codepoints for the Value Field of an Extended Community.

5.2.11.1. Traffic Action Field

   This registry does not need to be modified.

5.3. Registries for IPv6-Address-Specific ECs

5.3.1. Transitive Types

   This registry shall contain the following note:

      This registry contains values of the two high-order octets of an
      IPv6-Address-Specific Extended Communities attribute.

Registry Name: TRANSITIVE IPV6 ADDRESS SPECIFIC
               EXTENDED COMMUNITY TYPES

      RANGE   REGISTRATION PROCEDURE

      0x0000-0x00FF   First Come, First Served

      TYPE VALUE   NAME

      0x0002   Route Target
      0x0003   Route Origin
      0x0004   OSPFv3 Route Attributes (deprecated)
      0x000B   VRF Route Import
      0x0010   Cisco VPN-Distinguisher
      0x0011   UUID-based Route Target

[5.3.2](5.3.2). Non-Transitive Types

   This registry shall contain the following note:

      This registry contains values of the two high-order octets of an
      IPv6-Address-Specific Extended Communities attribute.

Registry Name: NON-TRANSITIVE IPV6 ADDRESS SPECIFIC
               EXTENDED COMMUNITY TYPES

     RANGE   REGISTRATION PROCEDURE

     0x4000-0x40FF   First Come, First Served

     None assigned

[6](6). Security Considerations

   No security considerations are raised by this document.

[7](7). Acknowledgments

   The authors wish to thank Jon Mitchell, Hyojeong Kim, and Pearl Liang
   for their review and comments.

   The authors wish to thank Amanda Baber of IANA for educating us on
   some of the problems faced by IANA staff when responding to requests
   for BGP Extended Community Type and Sub-Type codepoint allocations.

[8](8). Authors' Addresses

   Yakov Rekhter
   Juniper Networks
   1194 North Mathilda Ave.
   Sunnyvale, CA 94089
   Email: yakov@juniper.net

Eric C. Rosen
Cisco Systems, Inc.
1414 Massachusetts Avenue
Boxborough, MA, 01719
Email: erosen@cisco.com

9. Normative References

[RFC3692] "Assigning Experimental and Testing Numbers Considered
Useful", Narten, RFC 3692, January 2004

[RFC4020] "Early IANA Allocation of Standards Track Code Points",
Kompella, Zinin, RFC 4020, February 2005

[RFC4360] "BGP Extended Communities Attribute", Sangli, Tappan,
Rekhter, RFC 4360, February 2006

[RFC5226] "Guidelines for Writing an IANA Considerations Section in
RFCs", Narten, Alvestrand, RFC 5226, May 2008

[RFC5701] "IPv6 Address Specific BGP Extended Community Attribute",
Rekhter, RFC 5701, November 2009